Volume XIV, No. 1 Spring 2011

WaterLine

A publication about Ontario's water and wastewater industry.

Facilities of the Future

Let's face it. If you ask someone to give you an example of industry-changing technology, you're more likely to hear about the iPad 2 than your local water or wastewater treatment plant. But around the world, there's some incredible innovation taking place. We asked a few experts to share their thoughts on what the facilities of the future might look like.

"Historically, the water and wastewater industry has been fairly slow to change. Having said that, we're seeing the emergence of some very exciting technologies," says Kerry Freek, Editor of *Water Canada* magazine. "On the wastewater side, I think one of the biggest changes we'll see 10 to 15 years from now is a much more efficient facility – one in which we're actually able to extract energy and revenue-generating products from the wastewater."

She points to Vancouver-based Ostara as an example of one of the companies leading the way in the emerging field of nutrient recovery. Ostara creates value from waste by recovering nutrients from wastewater and transforming them into revenue-generating, environmentally-friendly commercial fertilizer.

"I think the past approach in wastewater treatment was to do what you need to do in order to satisfy regulatory compliance," says Dr. Wayne Parker, P. Eng., Professor of Civil Engineering at the University of Waterloo. "Increasingly, the approach in places like Europe, Singapore and China, is to turn the wastewater process from an energy sink into an energy source. There are companies working on ways to capture energy from organics and convert them to a bio gas – technology that could potentially make the facility net-energy generating. That's a compelling prospect, particularly given the massive amount of energy a wastewater treatment plan needs to operate."

Other companies are devising clever, relatively inexpensive solutions to address challenges such as leak detection in water distribution systems. "On a recent visit to Israel, I met with a company called TaKaDu," says Freek. "They apply advanced mathematical equations to the system's pre-existing data sources (flow, pressure, etc.) to help identify the specific areas where utilities are losing water. There's no additional infrastructure or capital investment required – this is simply the application of math to help solve an old and expensive problem."

Perhaps one of the more controversial industry innovations, however, is the 'indirect potable reuse' of wastewater. And while many people still tend to react with alarm upon learning of the technique, the fact is that purified wastewater can be safe for drinking and has the potential to both alleviate environmental strains and lessen the impact of a global water crisis.

The process involves putting wastewater through a very thorough, multiple barrier treatment, which includes microfiltration, reverse osmosis and ultraviolet disinfection. The practice of reclaiming wastewater as potable water (although not necessarily for drinking) is already being used in locations such as San Diego, Singapore and Namibia – and most famously on the International Space Station. In Singapore, this reclaimed water, which goes by the name of NEWater, consistently exceeds the requirements set by the United States Environmental Protection Agency and the World Health

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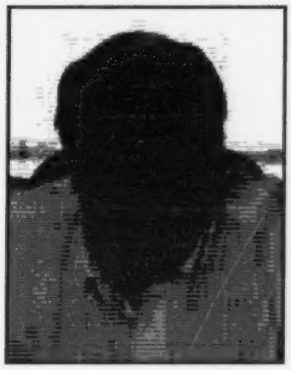

Welcome to the Spring 2011 issue of *WaterLine*

A message from
George Terry, VP of Operations
Northern Ontario

I'm pleased to report that no trees were harmed in the making of this newsletter...

After 15 years of providing you with stories about water-related news, trends and developments, we've transformed ***WaterLine*** into an exclusively online publication. It just made sense. In addition to the small but important benefit to the environment, this new online format makes the newsletter easier for you to share with your colleagues and allows us to include links to additional information sources in our articles. The switch to an online format is also more cost-effective, allowing us to eliminate printing and postage costs.

With each passing day, winter is drawing nearer to a close. Soon, the icy temperatures, snow banks and skating rinks will be a distant memory. What will remain, however, is the legacy of a winter's worth of road salt. In our story on page 3, we look at the dilemma facing Ontario's municipalities with respect to road salt – in other words, the need to balance road safety with environmental responsibility when it comes to the use of sodium chloride.

In this issue, we also explore some new research into the potential effects of pharmaceuticals in our lakes and rivers. Dr. Sébastien Sauvé from the University of Montreal sheds some light on a recent study that found these drugs were having physiological impacts on fish. The research raises important questions about the possible effects on humans.

We also take a look at some cutting-edge technology and innovations in the water and wastewater business and get some industry experts to share their thoughts on what the facility of the future might look like.

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We hope you enjoy our new, online format. And as always, we'd love to hear your feedback, questions or suggestions. You can write to us at waterline@ocwa.com.

Antidepressants in effluent affect brain activity in fish: Study

While effects on humans appear to be negligible, impact on ecosystem warrants concern

A new study says there's enough antidepressant medicine in Montreal's municipal wastewater to affect brain activity in fish. The study from the University of Montreal's chemistry department says most communities could expect similar results, since Montreal has a typical wastewater treatment system.

The controlled study involved exposing brook trout to varying amounts of effluent over a three-month period. The researchers found a clear reduction in synaptic response in the brain tissue of trout exposed to wastewater containing the antidepressant drugs.

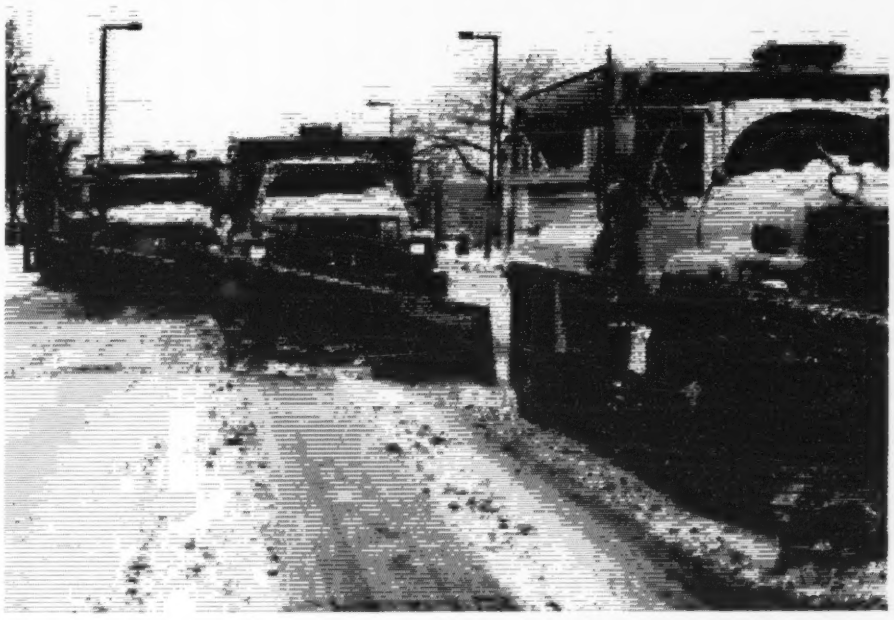
The concentration of the drugs was low – researchers said the concentration found downstream in the St. Lawrence River is roughly equivalent to a few grains of salt in an Olympic-sized swimming pool. Nonetheless, the levels were high enough to accumulate in the brains of fish and provoke a statistically significant biological response.

"In terms of human concern, there's little to be worried about," says Dr. Sébastien Sauvé, Associate Professor in the Department of Chemistry at the University of Montreal. "However, we are seeing an impact on the fish and the river's ecosystem, which should concern cities everywhere."

Dr. Sauvé says while ozone treatment can help reduce the level of antidepressants in the wastewater as it leaves the facility, the chemical structure of the medication makes it very difficult to remove all traces.

"Right now, the cause for concern is that the fish are being affected," he says. "Clearly, these findings raise more questions that need to be investigated." Going forward, Sauvé and his team are planning to look at the presence of other substances, including endocrine disruptors, antibiotics and chemotherapy compounds.

Tackling the Road Salt Dilemma



What's more important?

A) Protecting the environment, or

B) Ensuring the safety of our roads in winter.

The answer, of course, is C) All of the above. This, in its simplest form, is the road salt dilemma.

We need salt to keep our roads safe and to allow the wheels of commerce to turn. But that safety comes at a price, which can include groundwater contamination, damage to property and vegetation, harm to small fish species and the corrosion of vehicles and municipal infrastructure.

Many Ontario municipalities continue to introduce new policies and technologies intended to use salt in a more strategic fashion, while maintaining road safety. "Environmental protection was an important consideration in the development of our winter road maintenance program," says Nathalie Mihelchic, P.Eng, Manager of Operations with the City of Greater Sudbury. "For example, we have specific road maintenance procedures for different weather conditions and different road classifications. We also incorporated the use of brine which pre-wets salt to help it react more quickly with snow and ice and reduces the amount of 'bounce' you can get with dry salt, helping to keep it on the roadway."

The city has also introduced the use of electronic spreader controls on its trucks, which regulate the amount of salt being distributed depending on the weather conditions. Sudbury is also a member of the Ontario Road Salt Management Group, a group made up of members from municipalities, government ministries and municipal associations. "We meet every three months to share best practices and to review new technologies, machinery and techniques to better use salt while maintaining public safety," Mihelchic says.

In 2004, the Government of Canada published a document titled a *Code of Practice for the Environmental Management of Road Salts*. This document was designed primarily to help municipalities and other road authorities better manage road salt use and reduce the adverse environmental impacts of chloride, while maintaining road safety. The document was intended for use in conjunction with the *Salt Management Guide and Syntheses of Best Practices* (SOBPs) developed by the Transportation Association of Canada (TAC). Specifically, the Code recommended that on a voluntary basis road authorities applying more than 500 tonnes of road salt per year develop salt management plans and implement best management practices for salt application, salt storage and snow disposal as reported in SOBPs.

A recent report titled *Assessing the Efficacy of Current Road Salt Management Programs* (by Dr. Michael Stone and a team of environmental scientist at the University of Waterloo) reported that the Code of Practice has strongly contributed to the adoption and improvement of salt management practices in Ontario by helping to standardize practices and advance the rate of implementation of best practices. At the same time, Stone says, "Barriers to further implementation of the Code include understanding the Code, institutional will, liability, limited technical and financial resources as well as public expectation of high service levels."

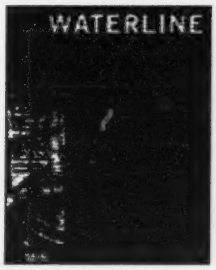
Stone says there are steps municipalities can take to help encourage smarter salt practices. "The first is to increase training," he says. "Employees and contractors need to be continually educated about proper salt management and application techniques. Municipalities can also update their equipment. For example, they can go from a truck with a standard salt rotor to something that distributes a liquid spray. There's even technology available that can tell the driver the temperature of the pavement, which can inform the salt application process."

"Ultimately, this is a very complex social and economic problem," says Stone. "The best way approach is to continue to improve the technology and to educate not only the practitioners, but also the public."

WaterLine Enters the eWorld

Since its inception, OCWA's ***WaterLine*** has provided items of interest from the water and wastewater industry, to municipalities across the Province.

We've all come a long way since that first issue, back in 1998. And while ***WaterLine***'s 'look' over the years may have changed, one thing has remained constant: our commitment to providing Ontario municipal staff with useful and timely information. Whether it's updates on new legislation and regulations, new research and innovation, water and wastewater conservation tips, or information on industry events, it can be found in *WaterLine*.



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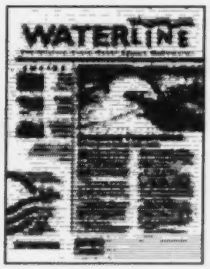

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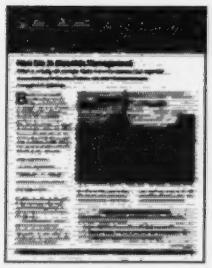
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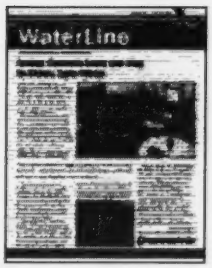

WaterLine 2007

And now, as we continue to grow and evolve, OCWA is pleased to announce another significant milestone for *WaterLine* – effective immediately, *WaterLine* is going electronic! You will continue to receive the same valuable information you have come to expect from ***WaterLine***, but in an e-newsletter delivered right to your inbox. No need to sign up or contact us – all current recipients will get the electronic version automatically – unless by chance we don't have your e-mail address, and in that case we'd ask you to e-mail it to us at waterline@ocwa.com.

As part of our commitment to clean water and community health, OCWA is committed to being a strong steward of our environment. This move to a paperless newsletter is just one more example of OCWA working to reduce its carbon footprint, and further improve our conservation efforts. We hope you will be as enthusiastic as we are about this new 'e-venture'.

Look for ***WaterLine***, coming soon to an inbox near you.

Ontario Drinking Water Stewardship Program Update

Nearly four years after its creation, the popular Ontario Drinking Water Stewardship Program continues to help landowners, businesses and municipalities undertake local projects aimed at protecting municipal sources of drinking water. The program was launched by the Provincial Government in 2007 under the *Clean Water Act* with an initial investment of $28 million.

In the first three years, the Ministry of the Environment provided funding to conservation authorities to deliver an Early Actions program. This first phase of the program funded landowners, businesses and municipalities near municipal wells and intakes to undertake projects such as well decommissioning and upgrading, septic system inspections and upgrades and runoff and erosion control measures. To date, more than 2,000 projects have been supported. Some conservation authorities continue to have funding available for Early Action projects.

In year four, the program evolved to include an Early Response program aimed at addressing significant drinking water threats. The Early Response program, which is also being delivered by Ontario's conservation authorities, funds projects such as improvements to septic systems, management and storage of pesticides and fertilizers and proper storage and management of fuel. The ministry also awarded funding to municipalities to secure land and to undertake large projects aimed at protecting municipal drinking water sources. A total of $7 million has been made available in year four of the program.

For more information on eligibility for either Early Actions or Early Response funding, please contact your local conservation authority. And to learn more about the Ontario Drinking Water Stewardship Program, please visit the Ministry's ODWSP page. http://www.ene.gov.on.ca/environment/en/legislation/clean_water_act/.

Facilities of the Future

continued from page 1

Organization and is said to be cleaner than Singapore's other sources of water.

These are just a few examples of technological innovations promising to change the face of the water and wastewater treatment industries in years to come. There are also major advances being undertaken in the areas of conservation, low-impact developments (e.g. reed beds), reducing a plant's carbon footprint and creating long-term mitigation plans for climate change.

"There's a lot to be positive about. We're witnessing the beginning of an exciting period of change in the industry," says Parker.

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